CLAIMS

1. A data traffic manager, comprising:

an enqueue engine connected to at least one port for receiving cells of data, wherein the enqueue engine determines whether a cell of data is one of conformant and non-conformant;

a plurality of per-class shaper queues connected to the enqueue engine that receive respective cells of data from the enqueue engine, wherein the shaper queues are spaced generally equally in time and wherein a conformant cell is queued to a currently served queue and a non-conformant cell is shaped based on a cell delay time; and

a time spaced round robin (TSRR) scheduler connected to the plurality of per-class queues for scheduling cells of data from the shaper queues for transmission.

2. The data traffic manager of claim 1, wherein the enqueue engine is connected to at least one ATM port.

3. The data traffic manager of claim 2, wherein the enqueue engine receives constant bit rate (CBR) cells, real time-variable bit rate (rt-VBR) cells and non-real time variable bit rate (nrt-VBR) cells.

4. The data traffic manager of claim 3, wherein the plurality of per-class shaper queues includes at least one CBR class queue, at least one rt-VBR class queue and at least one non-real time variable bit rate nrt-VBR class queue.

5. The data traffic manager of claim 4, wherein for each class, there are 'n' shaper queues of size 's', wherein n and s are different for each class depending on a granularity and a total number of queues available.

6. The data traffic manager of claim 5, wherein each shaper queue within a class is serviced cyclically for 's' ticks in a cycle of n*s ticks.

7. The data traffic manager of claim 6, wherein between classes, the TSRR scheduler performs scheduling based on predetermined weight and priority values for each class.

8. The data traffic manager of claim 4, wherein the plurality of per-class shaper queues includes a UBR class queue.

9. The data traffic manager of claim 8, further comprising a timer connected to the TSRR scheduler for providing timing information thereto.

10. The data traffic manager of claim 9, wherein the TSRR scheduler schedules cells from the shaper queues and the UBR class queue based on predetermined weight and priority values and timing information generated by the timer.

11. The data traffic manager of claim 9, wherein the enqueue engine manages the shaper queues with a threshold tail drop mechanism and protects queue availability for conformant cells.

12. The data traffic manager of claim 11, wherein the enqueue engine discards a cell that has to be delayed beyond a predetermined time period.

13. The data traffic manager of claim 9, wherein the enqueue engine discards a cell when the shaper queue thereof exceeds a predetermined threshold value.

14. The data traffic manager of claim 9, wherein the enqueue engine determines a shaper queue to be used for a data cell via a generic cell rate algorithm (GCRA).

15. The data traffic manager of claim 9, wherein the enqueue engine determines a shaper queue to be used for a data cell via a modified generic cell rate algorithm (GCRA).

16. A data traffic manager that receives cell data of various class types from one or more data ports, the traffic manager comprising:

a plurality of per-class queues connected to the one or more data ports, wherein at least one per-class queue is provided for each class of cell data and cell data from each class is queued in its respective queue;

a first scheduler connected to the plurality of per-class queues for scheduling the cell data and associated virtual connection (VC) traffic and Quality of Service (QoS) parameters;

a shaper enqueue engine connected to the first scheduler for managing the cells and their associated VC and QoS data;

a plurality of per-class shaper queues connected to the enqueue engine that receive and queue respective cells and their associated data managed by the enqueue engine, wherein at least one shaper queue is provided for each class;

a timer for generating timing information; and

a second scheduler, connected to the plurality of per-class shaper queues and the timer, for scheduling cells of data from the shaper queues for transmission.

17. The data traffic manager of claim 16, wherein the first scheduler schedules the cell data and associated VC and QoS parameters from the per-class queues using a weighted round robin algorithm.

18. The data traffic manager of claim 17, wherein the shaper enqueue engine determines which shaper queue is to be used for queuing cell data using a modified generic cell rate algorithm (GCRA).

19. The data traffic manager of claim 18, wherein the shaper enqueue engine manages the shaper queues with a threshold tail drop mechanism.

20. The data traffic manager of claim 19, wherein the shaper enqueue engine discards cell data that has to be delayed beyond a predetermined time limit.

21. The data traffic manager of claim 18, wherein the second scheduler schedules the cell data from the per-class shaper queues based on a class weight and priority algorithm.

22. The data traffic manager of claim 21, wherein the shaper enqueue engine manages the shaper queues within a class cyclically using the timing information generated by the timer.

23. The data traffic manager of claim 22, wherein the shaper enqueue engine manages the shaper queues such that between classes, scheduling is performed on a class priority basis.

24. The data traffic manager of claim 16, wherein the plurality of per-class queues includes constant bit rate (CBR), real time variable bit rate (rt-VBR), non-real time variable bit rate (nrt-VBR), and unspecified bit rate (UBR) class queues.

25. The data traffic manager of claim 24, wherein the plurality of per-class shaper queues includes CBR, rt-VBR, and nrt-VBR class queues.

26. A method of managing ATM data traffic, comprising the steps of:

receiving ATM cell data from a data port;

analyzing the received data with an enqueue engine using a modified generic cell rate algorithm (GCRA);

placing the analyzed cell data into one of a plurality of per-class shaper queues; and

scheduling the cell data stored in the per-class shaper queues for transmission using a weighted priority round robin algorithm.

27. The method of managing ATM data traffic of claim 25, wherein plurality of per-class shaper queues includes at least one CBR class queue, at least one rt-VBR class queue and at least one non-real time variable bit rate nrt-VBR class queue.

28. The method of managing ATM data traffic of claim 26, wherein for each class, there are 'n' shaper queues of size 's', wherein n and s are different for each class depending on a granularity and a total number of queues available.

29. The method of managing ATM data traffic of claim 27, wherein each shaper queue within a class is serviced cyclically for 's' ticks in a cycle of n*s ticks.

30. The method of managing ATM data traffic of claim 28, wherein the plurality of per-class shaper queues includes a UBR class queue.